5.16.38 DENSITY OF FRESH CONCRETE IN PAVEMENT BY NUCLEAR GAUGE (Kansas Test Method KT-38)

**a. SCOPE**

This method of test covers the procedure for determining the in- place density of fresh concrete in pavements using nuclear density gauge. This method is applicable to all types of concrete. KT-38 reflects testing procedures found in AASHTO T 271. **Gauge calibration shall follow 5.21.02 INDEPENDENT ASSURANCE REPLICATE (ASR) CHECK FOR NUCLEAR DENSITY GAUGES.** KDOT gauges shall be calibrated at the Materials and Research Center.

**The equipment utilizes radioactive materials which may be hazardous to the health of users unless proper precautions are taken (For KDOT field personnel only: Refer to Standard Operating Manual No. 1.13.2).**

**b. REFERENCED DOCUMENTS**

**b.1.** KT-20; Weight per Cubic Meter (Foot), Yield Cement Factor and Air Content (Gravimetric) of Fresh Concrete

**b.2.** AASHTO T 271; Density of Plastic and Hardened Portland Cement Concreter in Place by Nuclear Methods

**c. APPARATUS**

**c.1.** Nuclear density gauge with supporting equipment including reference standard, survey meter and instructional material.

**d. DAILY WARM-UP CHECK**

The nuclear gauge shall be turned on for warm up and checked according to the manufacturer's instructions.

**e. DENSITY READINGS OF THE IN-PLACE CONCRETE**

**e.1.** Transverse Profile of Densities: A transverse profile of wet[a] densities shall be taken to evaluate the effectiveness of the consolidation system. This profile is developed by taking a single one-minute density reading in each vibrator path and in each gap between two vibrators across the entire placement width. Although not all readings can be obtained at one station, an effort should be made to develop the profile in as short a time as possible. A complete profile needs to be run each time a change is made in the placement machine which could effect consolidation.

**e.2.** In-Place Concrete Densities: The daily wet[a] density readings should be taken in both the vibrator paths and the gap between vibrators to verify the density profile as well as document the percent of required

consolidation taking place. These readings shall be the average of 3 one-minute counts and should be taken no closer than 0.3 m (1 ft) to a vertical edge nor with in 0.6 m (2 ft) of a dowel basket assembly.

**e.3.** Place the gauge on the surface and depress the probe to the appropriate depth, normally 200 mm (8 in).

After the readings are taken, lift the gauge from the concrete by the case and clean the probe before withdrawing it into the case.

**f. CALCULATION**

The wet[a] density (WD) is divided by the three point moving average of the vibrated unit weight of concrete, **KT-20**, and multiplied by 100 to obtain a percent density. When fewer then three vibrated unit weights of concrete are available, the "standard density" shall be the average of those determinations made until a total of three may be averaged.

$$\% \text{ Consolidation} = \frac{100(WD)}{\text{Standard Density}}$$

**NOTE a**: For concrete, record the WD reading from the nuclear density gauge.